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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the polarizing plate which used a light polarizer protective film and this.

[0002]

[Description of the Prior Art]A linear polarization plate is a material which has a function which makes only the linear polarization which has a specific vibrating direction among the lights to penetrate penetrate, and covers other linear polarization.

For example, it is widely used as one of the parts which constitute a liquid crystal display.

What has the composition by which the polarizer film and the protective film were laminated as such a linear polarization plate is generally used.

[0003]Said polarizer film is a film which has a function which penetrates only linear polarization with a specific vibrating direction, for example, a polyvinyl alcohol (henceforth [ PVA ]) film etc. are extended, and, generally the film dyed by iodine, dichromatic dye, etc. is used.

[0004]Said protective film holds a polarizer film, and bears the function of giving practical intensity to the whole polarizing plate, and, generally the triacetyl cellulose (henceforth [ TAC ]) film etc. are used. This protective film may be called in the industry a base material or a base film.

[0005]Since polarizability tends to fall [ a polarizer film ] easily according to moisture absorption, By using the film stock whose moisture transmissivity (moisture vapor transmission) is smaller than the conventional TAC film as a protective film, the trial which is going to control the moisture absorption from the outside after pasting, and is going to lessen degradation of a polarizer film is made.

[0006]As for a polarizing plate, since it is required that the light after polarizing plate passage should be highly precise linear polarization, it is not preferred that a protective film produces unnecessary phase contrast. Although a TAC film is also used [ what has small phase contrast ] fundamentally, since it tends to produce change of phase contrast by operation of external force, By using the film stock whose photoelastic coefficient is smaller than the conventional TAC film as a protective film, the proposal which is going to control the phase contrast change by the stress load after pasting, and is going to lessen degradation of a polarizing plate is made.

[0007]When an example is given, in JP,7-77608,A. The moisture vapor transmission of 80 \*\* and 90%RH is 200 g/m<sup>2</sup> and 24hr, and 100micro or less, and it is indicated that a photoelastic coefficient raises the

resistance to moist heat of a polarizing plate using the protective film which is below  $1 \times 10^{-11} \text{ cm}^2/\text{dyne}$ .  
[0008]On the other hand, these polarizer films and protective films are pasted together via an adhesives layer, and a protective film is used with the gestalt laminated by one side or both sides of the polarizer film. As adhesives which constitute an adhesives layer, it is common that water-soluble PVA system adhesives etc. are used. As an industrial laminating method, roll conveyance of a polarizer film and the protective film is carried out, and after applying adhesives among both films in a pasting process and pasting together by application-of-pressure adhesion, generally the method of obtaining the polarizing plate unified through the predetermined drying process is used.

[0009]In said mode, it is required for the adhesive strength of a polarizer film and a protective film to be sufficiently high, and it is required from a protective film that the wettability of adhesives is good, that adhesive strength with adhesives should be high, etc. For example, also in said TAC film, if it is used as it is, after the adhesive strength after pasting whose wettability of adhesives is not enough will immerse in lye the field which it is going to paste up beforehand and will carry out saponification processing from the reasons of fully not being obtained, the actual condition is used.

[0010]

[Problem(s) to be Solved by the Invention]However, even if it was going to use simply film stock with small moisture transmissivity (moisture vapor transmission) proposed from the former, and a raw material with a small photoelastic coefficient as a protective film as it was, adhesive strength with a polarizer film is not fully obtained, but became insufficient [ the functional expression as a protective film ] easily.

[0011]Then, this invention person improved the fault of conventional technology, and examined wholeheartedly the art which can give adhesive strength without spoiling the military requirement as a protective film.

[0012]

[Means for Solving the Problem]As a result, when an angle of contact with pure water of the surface of a specific high polymer film considered it as less than 50 degrees, it found out that a polarizing plate which has improved an adhesive property with a polarizer film, and was excellent in endurance was obtained, and resulted in this invention.

[0013]Namely, moisture vapor transmission in 70 \*\* and 90%RH used by laminating this invention to one side or both sides of a polarizer film is a light polarizer protective film of 500g / (m<sup>2</sup> and 24hr) following, An angle of contact with pure water of an opposed face with a polarizer film provides a light polarizer protective film which is less than 50 degrees.

[0014]Here, an opposed face with a polarizer film is an alkali treatment side preferably.

[0015]An opposed face with a polarizer film is a corona treatment side preferably.

[0016]An opposed face with a polarizer film is UV ozonization side preferably.

[0017]A phase difference value is 0 to 20 nm, the optical property of a light polarizer protective film of this invention is preferred, and light transmission is [ Hays ] 2% or less not less than 85%.

[0018]A light polarizer protective film of this invention consists of a resin composition containing thermoplastics which has substitution or an unsubstituted imido group in the (A) side chain, and thermoplastics which has substitution or an unsubstituted phenyl group, and a nitrile group in the (B) side chain preferably.

[0019]Thermoplastics of the above (A) consists of an olefin component and an ingredient which has substitution or an unsubstituted imido group in a side chain preferably.

[0020]According to the side of further others of this invention, at least one side of a polarizer film is provided with a polarizing plate which a light polarizer protective film of said this invention laminates.

[0021]

[Embodiment of the Invention]As for the moisture vapor transmission in 70 \*\* and 90%RH of the light polarizer protective film of the viewpoint of controlling the water penetration inside a polarizing plate to this invention, it is preferred that they are 500g / (m<sup>2</sup> and 24hr) following. 450g / (m<sup>2</sup> and 24hr) following is 400g / (m<sup>2</sup> and 24hr) following still more preferably more preferably. By one side, the adhesives of a drainage system are used in many cases, and when moisture vapor transmission is too low, there is a possibility that desiccation of drainage system adhesives may be delayed in adhesion of a light polarizer protective film. Therefore, moisture vapor transmission has preferred 50g / (m<sup>2</sup> and 24hr) above, and 100g / (m<sup>2</sup> and 24hr) above is 200g / (m<sup>2</sup> and 24hr) above still more preferably more preferably.

[0022]As for the phase difference value of the viewpoint that the polarizability of the polarizing plate obtained using the light polarizer protective film of this invention is fully securable to said high polymer film, 20 nm or less is preferred, and it is more preferred that it is 10 nm or less.

[0023]As for the light transmission of the viewpoint that the transmitted light amount of the polarizing plate obtained using the light polarizer protective film of this invention is fully securable to said high polymer film, it is preferred that it is not less than 85%, and, as for Hays, it is preferred that it is 2% or less.

[0024]Although 100% of light transmission is ideal, even if actually less than some 95% or 95%, it does not become a big problem as a light polarizer protective film. However, when less than 85%, there is a possibility of causing the degradation of a polarizing plate. Therefore, not less than 85% of light transmission is desirable, and especially more preferably [ not less than 89% of ] desirable not less than 87%.

[0025]Although 0% of Hays is ideal, even if it exceeds some 0.1% or 0.1%, actually, it does not become a big problem as a light polarizer protective film. However, when 2% is exceeded, there is a possibility that polarization may be confused. Therefore, 2% or less of Hays is desirable, and especially more preferably [ 1% or less of ] desirable 1.5% or less.

[0026]Although the film with which it is satisfied of the above-mentioned moisture vapor transmission is not decided only by resin composition of a film and film thickness also influences, As resin composition, polycarbonate resin, polyarylate resin, polysulfone resin, Polyether sulfone resin, norbornene resin, polystyrene resin, Polyacrylate resin, polymethacrylate resin, polyester resin, or -- the thermoplastics which has substitution or an unsubstituted imido group in the (A) side chain, and the thermoplastics which has substitution or an unsubstituted phenyl group, and a nitrile group in the (B) side chain can be illustrated -- these -- it can be independent, or it can mix and can use.

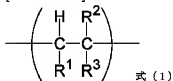
[0027]The thermoplastics which has substitution or an unsubstituted imido group in norbornene system resin and the (A) side chain more preferably, (B) Especially since it is easy to obtain the high polymer film excellent in the above-mentioned phase difference value, light transmission, and the characteristic of Hays besides moisture vapor transmission, the resin composition which the thermoplastics which has substitution or an unsubstituted phenyl group, and a nitrile group is mentioned to a side chain, and is explained in full detail below is preferred.

[0028] Especially it described above, a desirable high polymer film can be obtained from the resin composition containing the thermoplastics which has substitution or an unsubstituted imido group in the (A) side chain, and the thermoplastics which has substitution or an unsubstituted phenyl group, and a nitrile group in the (B) side chain.

[0029] Said thermoplastics (A) is thermoplastics which has substitution or an unsubstituted imido group in a side chain. Desirable characteristic balance can be revealed in respect of an optical property, heat resistance, etc. by having substitution or an unsubstituted imido group in a side chain. Said thermoplastics (A), It is preferred that it is an olefin maleimide copolymer (duality or plural copolymers beyond it) containing the repeating unit which has the repeating unit, at least one sort of substitution, or unsubstituted maleimide structure derived from at least one sort of olefins (alkene). Said olefin maleimide copolymer is a following formula (1).

[0030]

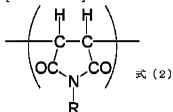
[Formula 1]



( $\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  show hydrogen or the alkyl group of the carbon numbers 1-8 independently among a formula, respectively.) -- the repeating unit expressed and following formula (2)

[0031]

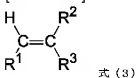
[Formula 2]



(among a formula, R shows hydrogen, an alkyl group of the carbon numbers 1-18, or a cycloalkyl group of the carbon numbers 3-12, and shows an alkyl group of the carbon numbers 1-18, or a cycloalkyl group of the carbon numbers 3-12 preferably.) -- it is preferred to contain a repeating unit expressed.

[0032] An olefin corresponding to a repeating unit (henceforth an olefin unit) of a formula (1) is a following formula (3). : [0033]

[Formula 3]



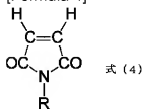
( $\text{R}^1$ ,  $\text{R}^2$ , and  $\text{R}^3$  show hydrogen or the alkyl group of the carbon numbers 1-8 independently among a formula, respectively.) -- it is expressed.

[0034] As an example of said olefin, isobutene, a 2-methyl-1-butene, 2-methyl-1-pentene, a 2-methyl-1-

hexene, a 2-methyl-1-heptene, 1-isooctene, 2-methyl-1-octene, 2-ethyl-1-pentene, a 2-ethyl-2-butene, a 2-methyl-2-pentene, a 2-methyl-2-hexene, etc. are mentioned. These olefins are independent, or can be combined two or more sorts and can be used.

[0035]A maleimide compound corresponding to a repeating unit (henceforth maleimide units) of said formula (2) is a following formula (4). : [0036]

[Formula 4]



(among a formula, R shows hydrogen, the alkyl group of the carbon numbers 1-18, or the cycloalkyl group of the carbon numbers 3-12, and shows the alkyl group of the carbon numbers 1-18, or the cycloalkyl group of the carbon numbers 3-12 preferably.) -- it is expressed.

[0037]As an example of said maleimide compound, maleimide and N-methylmaleimide, N-ethyl maleimide, N-n-propyl maleimide, N-i-propyl maleimide, N-n-butylmaleimide, N-i-butylmaleimide, N-s-butylmaleimide, N-t-butylmaleimide, N-n-pentylmaleimide, N-n-hexylmaleimide, N-n-heptylmaleimide, N-n-octylmaleimide, N-lauryl maleimide, N-substitution maleimide, such as N-stearyl maleimide, N-cyclo propyl maleimide, N-cyclo butylmaleimide, N-cyclopentylmaleimide, N-cyclohexylmaleimide, N-cycloheptyl maleimide, and N-cyclooctylmaleimide, etc. are mentioned. These maleimide compounds are independent or can be used combining two or more sorts. Especially as a maleimide compound, N-substitution maleimide (in a formula (4), R is bases other than hydrogen) is preferred.

[0038]Said thermoplastics (A) can be manufactured by polymerizing the above-mentioned olefin and a maleimide compound with a known polymerization method. Graft polymerization is also included in this polymerization. Or thermoplastics (A) can be manufactured also by making an amine compound react to this and making a maleic anhydride part of a precursor polymer imide-ize, after polymerizing the above-mentioned olefin and a maleic anhydride in accordance with a conventional method and considering it as a precursor polymer. In that case, as an amine compound to be used, can use amine corresponding to an imide part in maleimide units of said formula (2), and specifically, An amine compound expressed with R-NH<sub>2</sub> (however, R is the same as a formula (2).), For example, dimethylurea, diethylurea, etc. besides alkylamine, such as methylamine, ethylamine, n-propylamine, i-propylamine, n-butylamine, sec-butylamine, tert-butylamine, and cyclohexylamine, or ammonia can be illustrated preferably. Also in this case, a copolymer which has said olefin unit and maleimide units is obtained.

[0039]Said thermoplastics (A) can contain other copolymeric monomers as a copolymerization ingredient as ingredients other than said olefin unit and maleimide units. By making other copolymeric monomers contain to such an extent that the optical characteristic is not spoiled, the heat resistance of thermoplastics (A) can be raised or a mechanical strength can be increased. An acrylate monomer like methyl acrylate or butyl acrylate as an example of said copolymeric monomer, A methacrylic-acid-ester monomer like methyl methacrylate or cyclohexyl methacrylate, An acid anhydride etc. which have vinyl monomers, such as vinyl ester monomers, such as vinyl acetate, and a vinyl ether monomer like the methyl vinyl ether, and an

unsaturated double bond like a maleic anhydride are mentioned. These copolymeric monomers can be independent or can be used combining two or more sorts.

[0040] Although said thermoplastics (A) may be any of a random copolymer, a block copolymer, a graft copolymer, and an alternating copolymer, it is preferred that at least a part is alternating copolymer structure.

An olefin unit, i.e., an isobutylene unit, whose  $R^1$  [ in / in said thermoplastics (A) / a formula (1) ] is hydrogen and  $R^2$  and whose  $R^3$  are methyl groups, respectively, It is preferred that R in a formula (2) is a copolymer containing one or more sorts of maleimide units which are the alkyl groups chosen from a methyl group, an ethyl group, an isopropyl group, and a cyclohexyl group, and further An isobutylene unit, It is preferred that it is a copolymer containing N-methyl maleimide units.

[0041] As content of maleimide units in said thermoplastics (A), it is preferred that it is less than [ more than 30 mol % 80 mol % ], and it is less than more than 40 mol % 60 mol % more preferably. When content of maleimide units deviates from this range, there is a possibility that heat resistance and a mechanical strength of a phase difference film which are obtained may be spoiled.

[0042] As the total quantity of maleimide units and an olefin unit, it is preferred that it is more than [ of thermoplastics (A) ] 70 mol %.

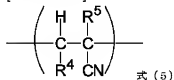
[0043] As for a molecular weight of said thermoplastics (A), it is preferred that more than  $1 \times 10^4$  is the weight average molecular weight below  $5 \times 10^5$ .

[0044] As for glass transition temperature of said thermoplastics (A), it is preferably preferred more preferably that it is not less than 130 °C still more preferably not less than 100 °C not less than 80 °C.

[0045] Said olefin maleimide copolymer can be manufactured by a method of itself known like previous statement, For example, as indicated to JP,5-59193,A, JP,5-195801,A, JP,6-136058,A, and JP,9-328523,A, It can manufacture by carrying out copolymerization of an olefin and the maleimide compound directly, or carrying out the graft copolymerization of another side to polymer of one of these, or making an amine compound react to a precursor polymer mentioned above, and introducing imide bonding. As said thermoplastics (B), a copolymer of an acrylonitrile styrene system can be used preferably. Thermoplastics (B) includes especially a styrene system unit shown with an unsaturated nitrile unit shown with a following formula (5), and a following formula (6) preferably.

[0046]

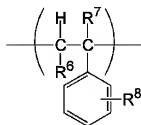
[Formula 5]



( $R^4$  and  $R^5$  show hydrogen or the alkyl group of the carbon numbers 1-8 independently among a formula, respectively.)

[0047]

[Formula 6]



式 (6)

( $R^6$  and  $R^7$  show hydrogen or the alkyl group of the carbon numbers 1-8 independently among a formula, respectively, and  $R^8$  shows hydrogen, the alkyl group of the carbon numbers 1-8, halogen, a hydroxyl group, an alkoxy group, or a nitro group.)

As a desirable example of the unsaturated nitrile compound which constitutes the above-mentioned desirable thermoplastics (B), The nitril compound etc. which have alpha like an alpha-substitution unsaturated nitrile compound like acrylonitrile or a methacrylonitrile and fumaronitrile and beta-disubstituted olefin nature unsaturated bond are mentioned.

[0048]As a desirable example of a styrene system compound which constitutes the above-mentioned desirable thermoplastics (B), unsubstituted [ , such as styrene, vinyltoluene, methoxy styrene, or chlorostyrene, ] or a substitution styrene system compound, alpha-substitution styrene system compounds, such as alpha-methylstyrene, etc. are mentioned.

[0049]A copolymer of said acrylonitrile styrene system may contain the third component if needed. For example, in order to raise the flexibility of a film, copolymerization of a kind or the two sorts or more can be carried out for olefin system monomers, such as acrylic monomers, such as butyl acrylate, ethylene, propylene, etc. In order to raise heat resistance, N substitution maleimide, such as phenylmaleimide, etc. can be used as a copolymerization ingredient.

[0050]Although said thermoplastics (B) can be obtained by carrying out copolymerization of these monomers directly, it may carry out the graft copolymerization of the monomer applicable to a styrene system or an unsaturated nitrile system polymer. A desirable copolymer can be obtained by carrying out the graft polymerization of a styrene monomer or the unsaturated nitrile system monomer to an acrylic polymer which has rubber elasticity. An unsaturated nitrile ingredient is acrylonitrile and a styrene monomer of especially a desirable monomer is styrene. These copolymers are known as an AS resin or AAS resin.

[0051]As for said thermoplastics (B), it is preferred to have the weight average molecular weight of  $1 \times 10^4$  thru/or  $5 \times 10^5$ .

[0052]In said thermoplastics (B), as content of an unsaturated nitrile system ingredient in a desirable copolymer, 20 to 60 % of the weight is desirable, and is 20 to 50 % of the weight more preferably. As content of a styrene system ingredient, 40 to 80 % of the weight is preferred, and is 50 to 80 % of the weight more preferably. Especially when the former is [ the latter ] 70 to 80 % of the weight at 20 to 30 % of the weight, a still more desirable result is given. When an ingredient of a styrene system or a nitrile system exceeds this range, phase contrast by orientation of a molecule in a film of this invention becomes large, and there is a possibility that it may become impossible to attain the purpose of this invention. It becomes the tendency for Hays of a film obtained by compatibility with thermoplastics (A) becoming scarce to become large.

[0053]As for content in thermoplastics (B), when a third component adds this, it is preferred that they are more than 5 mol % and less than 30 mol %. Especially a desirable ingredient of a nitrile system or a styrene

system changes with thermoplastics (A) and (B) to be used.

[0054] Thermoplastics (A) is a copolymer which mainly consists of isobutylene and N-methylmaleimide, When thermoplastics (B) is a copolymer which mainly consists of acrylonitrile and styrene, Preferably content of acrylonitrile and styrene 20 to 50 % of the weight, By considering it as 25 to 40 % of the weight more preferably, and making content of styrene into 60 to 75 % of the weight more preferably 50 to 80% of the weight, When a wide composition range shows good compatibility to a surprising thing and it is made it with a film, not less than 85% of total light transmittance and Hayes can obtain 2% or less of film. By making content of acrylonitrile into 26 to 29 % of the weight, and making content of styrene into 71 to 74 % of the weight especially, Thermoplastics (B) can show good compatibility in this thermoplastics (A) and 0 to 80% of the weight of a composition range, and can obtain not less than 90% of total light transmittance, and less than Hayes 1% and a very transparent film to a surprising thing.

[0055] In order to obtain a small film of phase contrast by orientation of a molecule, composition ratio of this thermoplastics (A) and thermoplastics (B) is important. Desirable composition ratio content of this thermoplastics (A) 50 to 80% of the weight generally more preferably, It is 55 to 70 % of the weight still more preferably, and content of this thermoplastics (B) is 30 to 45 % of the weight still more preferably 25 to 45% of the weight more preferably 20 to 50% of the weight 55 to 75% of the weight. As for thermoplastics (A) and thermoplastics (B), it is preferred to blend to 50 to 80 % of the weight of former at a rate of 20 to 50 % of the weight of latters, and especially their rate of 35 to 45 % of the weight of latters is preferred to 55 to 65 % of the weight of former.

[0056] The high polymer film used for this invention can contain publicly known additive agents, such as a plasticizer, a thermostabilizer, an ultraviolet ray absorbent, and a filler, and other compounds in the range which does not spoil an effect of this invention if needed.

[0057] A resin composition which consists of said additive agent used thermoplastics (A), thermoplastics (B), and if needed or other compounds is used for a film used for this invention, For example, it can obtain by film-izing by publicly known methods, such as a melt extruding method, a tubular film process, and the solution casting method. Especially, it may be preferred that thickness nonuniformity of a film depends a small film on the solution casting method from a viewpoint that it can obtain comparatively easily.

[0058] When film-izing by the solution casting method, after dissolving said resin composition in a solvent and casting on a base material, it dries and is considered as a film. As a desirable base material, films, such as an endless belt of stainless steel, a polyimide film, and a biaxial-stretching polyethylene terephthalate film, can be used.

[0059] If needed, it can exfoliate from a base material and a film which carried out predrying can also be dried further. Generally the desiccation of a film can use a float glass process, and a tenter or the roll conveying method. In the case of a float glass process, the film itself receives complicated stress and it is easy to produce unevenness of the optical characteristic. In the case of the tenter method, it is necessary to balance tension for supporting width contraction and prudence of a film accompanying solvent desiccation, and to perform expanding-and-contracting control of complicated width with a pin supporting film both ends, or distance of a clip. On the other hand, since a tension for stable film transport starts a flow direction (MD directions) of a film in principle in the case of the roll conveying method, it has the feature which is easy to fix the direction of stress. Therefore, as for desiccation of a film, being based on the roll conveying method is most preferred.



[0060]As said solvent, if it is a good solvent of said resin composition, there will be no restriction in particular, and it can choose from well-known various solvents, and can use. Halogenated hydrocarbon solvents, such as a methylene chloride and trichloroethane, tend to dissolve a resin material, and since the boiling point is also low, they are among the suitable solvents. A solvent of polar high non halogen systems, such as dimethylformamide and dimethylacetamide, can also be used. It is usable also in a solvent of ketone systems, such as cyclic ether systems, such as aromatic systems, such as toluene, xylene, and an anisole, dioxane, dioxolane and a tetrahydrofuran, and Piran, and methyl ethyl ketone. It is also a desirable method to be also able to mix and use these solvents mutually, and to mix nonsolvents, such as alcohol, and to control a vapor rate of a solvent in order to obtain a film which was excellent in surface nature.

[0061]It may be preferred one axis or to carry out multiaxial extension and to perform orientation treatment with a publicly known extension method, in a film obtained by a method by which said high polymer film mentioned intensity above according to the purposes, such as making it higher, for example. When performing stretching treatment in a viewpoint of liking to raise intensity, making anisotropy of intensity in a film plane as small as possible, it may be preferred to perform two axes or multiaxial extension.

[0062]In the case of film-izing, additive agents, such as a plasticizer, a thermostabilizer, and UV stabilizer, can be added if needed.

[0063]As an example of said plasticizer, dimethyl phthalate, diethyl phthalate, Phthalic acid di-n-butyl, di-n-octyl phthalate, phthalic acid di-n-ethylhexyl, Phthalic acid diisooctyl ester, di-n-octyl phthalate, phthalic acid di-n-decyl, Diisodecyl phthalate, phthalic acid di-n-dodecyl, phthalic acid IIISO tridecyl, Dicyclohexyl phthalate, phthalic acid benzyl butyl ester, di-2-ethylhexyl phthalate, Phthalate system plasticizers, such as di-isophthalate 2-ethylhexyl, adipic acid di-n-decyl, Diisodecyl adipate, di(2-ethylhexyl) adipate, di(2-ethylhexyl) azelate, Aliphatic-dibasic-acid system plasticizers, such as dibutyl sebacate and di-2-ethylhexyl sebacate, Tributyl phosphate, phosphoric acid tri-2-ethylhexyl, phosphoric acid-2-ethylhexyl, Phosphoric ester system plasticizers, such as phosphoric acid TORIKUREJIRU, epoxidized soybean oil, Fatty ester plasticizers, such as epoxy system plasticizers, such as epoxidation talloil-fatty-acid-2-ethylhexyl, butyl stearate, butyl oleate, a chlorinated paraffin, and chlorination fatty acid methyl ester, polyethylene-glycol wood ether, Polymers system plasticizers, such as a high molecular compound (polycondensation things, such as dibasic acid, such as adipic acid, sebacic acid, and phthalic acid, 1,2-propylene glycol, and 1,3-propylene glycol) containing polyethylene-glycol benzoic ester and an ester group, etc. are mentioned. A plasticizer which does not contain an aromatic group in these plasticizers, for example, adipic acid di-n-decyl, Diisodecyl adipate, di(2-ethylhexyl) adipate, di(2-ethylhexyl) azelate, Dibutyl sebacate, di-2-ethylhexyl sebacate, tributyl phosphate, Phosphoric acid tri-2-ethylhexyl, phosphoric acid-2-ethylhexyl, tricresyl phosphate, Epoxidized soybean oil, epoxidation talloil-fatty-acid-2-ethylhexyl, Butyl stearate, butyl oleate, a chlorinated paraffin, chlorination fatty acid methyl ester, Plasticizers, such as a high molecular compound (polycondensation things, such as dibasic acid, such as adipic acid and sebacic acid, 1,2-propylene glycol, and 1,3-propylene glycol) containing polyethylene-glycol wood ether or an ester group, are preferred.

[0064]Since said plasticizer does not have absorption in the visible region short wavelength side and it does not have an adverse effect on the wavelength dependency of phase contrast, it is an especially desirable additive agent. 2-20 weight-section addition of said plasticizer is usually carried out to high polymer film 100 weight section. If 20 weight sections are exceeded, it will become the tendency for the stability of a phase difference value at the time of extending a roll film continuously to be spoiled.

[0065]As for a light polarizer protective film of this invention, it is preferred that an angle of contact with pure water of an opposed face with a polarizer film is less than 50 degrees. When an angle of contact is large, sufficient adhesive strength with a polarizer film is not obtained, but even if it is a good optical property and low-moisture-permeability degree, it becomes a film which has a technical problem as a light polarizer protective film. An angle of contact of less than 40 degrees is more preferred, and is still more preferred. [ of less than 30 degrees ] It is less than 25 degrees especially preferably. As far as this invention persons can know, an adhesive property becomes good and an angle of contact of an adhesive property is so preferred but that it is low, and it is 3 times or more actually.

[0066]When an angle of contact of a film is large, a surface treatment may be performed and an angle of contact may be made small. As such a surface treatment, alkali treatment, corona treatment, plasma treatment, priming, UV ozonization, mat treatment, etc. occur. In these, short-time processing is comparatively possible for alkali treatment, and since a treatment effect is also high, it is preferred. Therefore, as for a light polarizer protective film of this invention, it is preferred that an opposed face with a polarizer film is an alkali treatment side. Corona treatment and UV ozonization are preferred at a point in which dry-type processing is possible about in the air of ordinary temperature. Therefore, a light polarizer protective film of this invention has preferred \*\*\*\*\* whose opposed face with a polarizer film is a corona treatment side or UV ozonization side.

[0067]After dissolving sodium hydroxide and a potassium hydrate in water or water / alcoholic mixed solution, considering it as an alkali solution as the method of alkali treatment for a film and immersing a film in this solution, a method of rinsing and drying is common, but. This method can be used also for a light polarizer protective film of this invention.

[0068]As for concentration of said alkali solution, although restriction in particular does not have it, when a processing speed side is taken into consideration, it is preferred to be referred to as 1-10N.

[0069]Although temperature of an alkali solution also influences processing speed, 20-95 \*\* is preferred and is 30-95 \*\* more preferably.

[0070]Although what is necessary is just to choose time to be immersed in an alkali solution suitably according to concentration, temperature, and a desired processing degree, it can usually be made into 30 seconds - 20 minutes. It is preferred to make alcohols, triethanolamines, etc., such as methanol and ethanol, live together in an alkali solution to shorten immersion time more.

[0071]Tetra alkylammonium hydroxide known as organic alkali as an alkali component, such as tetramethylammonium hydroxide, Organic nature ammonium hydroxide, such as hydroxyalkyl trialkylammonium hydroxide, such as hydroxylation 2-hydroxyethyl trimethylammonium, can also be used as suitable alkali. It is also possible for these organic alkali to be used as a mixed solution of solution or water, methyl alcohol, etc., and to use together non-ion system surface-active agents, such as a polyethylene glycol, if needed.

[0072]Although a method of carrying out corona treatment of the film surface by placing a film which it is going to process as the method of corona treatment for a film between electrodes which face, impressing high frequency voltage to inter-electrode, and making corona discharge perform is common, This method can be used also for a light polarizer protective film of this invention.

[0073]Although what is necessary is just to choose conditions of corona treatment suitably according to construction material of a film, and a desired processing degree, they can usually make a discharging

amount per unit processed area of a film more than  $0.5 - 40 \text{ kJ/m}^2$ .

[0074]As the method of UV ozonization for a film, Although a method of ozonizing a film surface by performing generating and excitation of ozone using a high-pressure mercury lamp etc. which can emit UV light with a wavelength of 185 nm and 254 nm under coexistence of a film which it is going to process is common, This method can be used also for a light polarizer protective film of this invention.

[0075]Although what is necessary is just to choose conditions of UV ozonization suitably according to construction material of a film, and a desired processing degree, they can usually make UV light output quantity per unit processed area of a film more than  $0.5 - 50 \text{ kJ/m}^2$ .

[0076]It can usually be used via a polarizer film and adhesives of a publicly known iodine system or a color system, carrying out lamination pasting of the light polarizer protective film of this invention. As said adhesives, drainage system adhesives which use a compound of a polyvinyl alcohol system as the main ingredients can be used conveniently.

[0077]

[Example]Hereafter, although an example explains this invention concretely, this invention is not limited to these examples.

[0078]Each weighted solidity was measured as follows.

[0079]It measured according to the method of <moisture transmissivity [ of a high polymer film ] (moisture vapor transmission)> JIS Z0208 statement.

[0080]It measured with the measured wavelength of 515 nm using the <phase contrast> micro polarization spectrophotometer (ORC Manufacturing Co., Ltd. TFM-120AFT).

[0081]It measured according to the method of 5.5 statements of <light transmission> JIS K7105-1981.

[0082]It measured according to the method of 6.4 statements of <Hayes> JIS K7105-1981.

[0083]Crookedness distortion was repeatedly given to the specimen using the \*\*\*\*\*-proof [ <flexibility> ] measuring device (Oriental energy machine factory MIT-D), and the number of times until a specimen fractures was measured.

[0084]Example 1 isobutene and alternating copolymer (N-methylmaleimide content %, glass transition temperature of  $157^{\circ}\text{C}$  of 50 mol) 60 weight section which comprises N-methylmaleimide, The content of acrylonitrile and styrene the resin composition which obtained it by carrying out melt kneading of the styrene acrylonitrile copolymer 40 weight section which are 28 % of the weight and 72 % of the weight, respectively, The melting extruded film was formed using the T-die extrusion machine (the cylinder diameter of 40 mm, ratio-of-length-to-diameter24), and the raw fabric film about 170 micrometers thick was obtained. As for 0 nm and light transmission, flexibility of Hayes was [ phase difference value of this raw fabric film ]  $6.03\% - 92\%$ .

[0085]This raw fabric film using extension test equipment (an Oriental energy machine factory, X4 HD-HT) A part for stretching speed/of 10 cm, It extended with free-end length 1 axis on with the draw magnification of 1.8 times, and an extension temperature of  $140^{\circ}\text{C}$  conditions, free Masakazu axis extension was performed in the direction which subsequently intersects perpendicularly with the previous extension direction on the same extension conditions, and the 50-micrometer-thick oriented film was obtained. As for the phase difference value of this oriented film (high polymer film 1),  $92\%$  and Hayes of 2 nm and light transmission were  $0.4\%$ , and the moisture vapor transmission of  $85\text{g}/(\text{m}^2 \text{ and } 24\text{hr})$   $70^{\circ}\text{RH}$  and  $90\% \text{RH}$  of the moisture vapor transmission of  $40^{\circ}\text{RH}$  was  $365\text{g}/(\text{m}^2 \text{ and } 24\text{hr})$ .

[0086]After this high polymer film 1 was immersed in the water / methanol mixed solution of the sodium hydroxide kept at 85\*\*5 \*\* (water: the methanol weight ratio 70:30, 40 % of the weight of sodium hydroxide concentration) for 30 minutes, the protective film which was fully rinsed and carried out alkali treatment was obtained. The angle of contact with the pure water of this film surface was 20 degrees.

[0087]After laminating this protective film to each of both sides of the polarizer film which extended the PVA film and was dyed with iodine via the solution (117 or 12 % of the weight of poval) of PVA system adhesives and making it stick to them with a reduction roll, it dried for 5 minutes at 70 \*\*, and the polarizing plate was obtained.

[0088]In the obtained polarizing plate, the polarizer film and the protective film were pasted up firmly, and even if it tried exfoliation, a film was able to fracture and was not able to exfoliate.

[0089]As a result of observing the state of the polarizing plate after neglecting the obtained polarizing plate under the environment of 60 \*\* and 90%RH for 500 hours, there is neither a color change nor a color omission, and neither the float of a film nor peeling was also seen.

[0090]Corona treatment of the high polymer film 1 used in example 2 Example 1 was carried out with the discharging amount of discharge electrode 14.6 kJ/m<sup>2</sup>, and the protective film which carried out corona treatment was obtained. The angle of contact with the pure water of this film surface was 27 degrees.

[0091]After laminating this protective film to each of both sides of the polarizer film which extended the PVA film and was dyed with iodine via the solution (117 or 12 % of the weight of poval) of PVA system adhesives and making it stick to them with a reduction roll, it dried for 5 minutes at 70 \*\*, and the polarizing plate was obtained.

[0092]In the obtained polarizing plate, the polarizer film and the protective film were pasted up firmly, and even if it tried exfoliation, a film was able to fracture and was not able to exfoliate.

[0093]As a result of observing the state of the polarizing plate after neglecting the obtained polarizing plate under the environment of 60 \*\* and 90%RH for 500 hours, there is neither a color change nor a color omission, and neither the float of a film nor peeling was also seen.

[0094]an example 3 batch-type UV ozonation device (the product made from Eye Graphics.) Using the high-pressure-mercury-lamp output 75W, UV ozonation (per unit area lamp output : 14.6 kJ/m<sup>2</sup>) of the high polymer film 1 used in Example 1 was carried out for 2 minutes, and the protective film which carried out UV ozonation was obtained. The angle of contact with the pure water of this film surface was 23 degrees.

[0095]After laminating this protective film to each of both sides of the polarizer film which extended the PVA film and was dyed with iodine via the solution (117 or 12 % of the weight of poval) of PVA system adhesives and making it stick to them with a reduction roll, it dried for 5 minutes at 70 \*\*, and the polarizing plate was obtained.

[0096]In the obtained polarizing plate, the polarizer film and the protective film were pasted up firmly, and even if it tried exfoliation, a film was able to fracture and was not able to exfoliate.

[0097]As a result of observing the state of the polarizing plate after neglecting the obtained polarizing plate under the environment of 60 \*\* and 90%RH for 500 hours, there is neither a color change nor a color omission, and neither the float of a film nor peeling was also seen.

[0098]After the high polymer film 1 used in comparative example 1 Example 1 was immersed in the solution (10 % of the weight of sodium hydroxide concentration) of the sodium hydroxide kept at 60\*\*5 \*\* for 2

minutes, the high polymer film 2 which fully rinsed and carried out saponification processing was obtained. The angle of contact with the pure water of the surface of this film was 58 degrees.

[0099]To each of both sides of the polarizer film which extended the PVA film and was dyed with iodine. After laminating the high polymer film 2 via the solution (117 or 12 % of the weight of poval) of PVA system adhesives and making it stick with a reduction roll, it dried for 10 minutes at 70 \*\*, and the layered product of a polarizer film and a high polymer film was obtained.

[0100]This layered product had the insufficient adhesion between a high polymer film and a polarizer film, and was in the state where both films produce a strike slip.

[0101]As a result of observing the state of the polarizing plate after neglecting the obtained layered product under the environment of 60 \*\* and 90%RH for 500 hours, in addition to a color change and a color omission being severe, neither the float of a film nor peeling kept the initial form of the layered product intense.

[0102]The moisture vapor transmission in RH the cellulose triacetate film which is  $1700\text{g}/(\text{m}^2 \text{ and } 24\text{hr})$  70 \*\*, and [ comparative example 280 micrometers in thickness, and ] 90%, After being immersed in the solution (10 % of the weight of sodium hydroxide concentration) of the sodium hydroxide kept at 60\*\*5 \*\* for 2 minutes, the cellulose triacetate film (TAC saponification film) which fully rinsed and carried out saponification processing was obtained. The angle of contact with the pure water of the surface of this TAC saponification film was 19 degrees.

[0103]To each of both sides of the polarizer film which extended the PVA film and was dyed with iodine. After laminating the TAC saponification film via the solution (117 or 12 % of the weight of poval) of PVA system adhesives and making it stick with a reduction roll, the polarizing plate which dried for 10 minutes at 70 \*\*, and laminated the polarizer film and the TAC saponification film was obtained.

[0104]In the obtained polarizing plate, the polarizer film and the TAC saponification film were pasted up firmly, and even if it tried exfoliation, a film was able to fracture and was not able to exfoliate.

[0105]As a result of observing the state of the polarizing plate after neglecting the obtained polarizing plate under the environment of 60 \*\* and 90%RH for 500 hours, the color change and the color omission were remarkable and were not maintaining the initial performance of the polarizing plate.

[0106]

[Effect of the Invention]the protective film of this invention turns to a polarizer film the field by which alkali treatment was carried out -- adhesives -- paste together with a polarizer film via drainage system adhesives preferably, and pass predetermined desiccation -- a polarizer film can be unified.

[0107]The light polarizer protective film of this invention can reveal adhesion processability and adhesive strength with the outstanding polarizer film, holding the feature that moisture vapor transmission is small.

[0108]The film of this invention can make wettability of drainage system adhesives good, when an angle of contact with the water of the field which touches adhesives is less than 50 degrees.

[0109]By using the light polarizer protective film of this invention, endurance and the polarizing plate which was specifically excellent in resistance to moist heat can be manufactured with sufficient productivity.

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[Translation done.]